THE ERUPTION IN THE STRAITS' SETTLEMENTS AND THE EVENING GLOW.

By R. von Lendenfeld, Ph.D.

The result of the so extremely carefully collected data referring to the connection between the eruption of Karakatoa, and the spreading of the evening glow, for which we are indebted to Professor Smith, of our University, is expressed by this author in the fellowing manner :—"We are driven therefore to conclude that the dust, if dust is really the agent in question, must have been meteoric, and had its origin outside our earth."

After this it would appear as if the data collected by Professor Smith, were not favourable to the hypothesis that the dust could be the volcanic dust of Karakatoa ; but the data collected, on the contrary prove convincingly, that Karakatoa was the centre of distribution of the evening glow, and that these set in two days after the eruption took place.

I do not intend in this paper to dwell in detail on the cause of the evening glow, and take it as granted, that the cause must be ascribed to fine particles floating in the air. There is a dispute whether these particles are ice-crystals or dust. If they were ice one must be able to discern those rings around the sun which always make their appearance when the sunlight is transmitted through clouds of ice-crystals. The radius of such rings which I have very often had occasion to observe during my Alpine experience is always 23°. Such rings have been observed of late in Europe, but not more frequently than in other years, and I think therefore, I am justified in considering dust as the cause of our glorious sunsets.

The question now arises whence this dust came. Two sources only appear possible, and which have been mentioned above.

The dust was distributed from a centre in the neighbourhood of Karakatoa with extraordinary velocity, averaging, according to the data of the first appearance of the after glow, 2,000 miles per day. This great rapidity only lasted two days, later on the distribution was very slow in comparison, averaging only 100 miles per day. This great rapidity of the distribution at first seems to me to prove, that the dust must be of meteoric origin. If a cloud of meteoric dust struck the atmosphere of the earth, which rotating very rapidly in the tropics moves in a different direction from the dust cloud, falling towards the earth, it would of course disperse this dust cloud immediately, and in this manner the great rapidity of distribution at the beginning is explained. Later on, when the dust was once moving with the atmosphere, the distribution of course was very much slower. If the dust came from Karakatoa, such a difference in the rapidity of the distribution at the beginning, and afterwards could not be accounted for. Besides it seems extraordinary that in connection with smaller eruptions no traces of after glow, even in the nearest vicinity of the Volcano (Naples), has ever been observed. The long duration of the after glow, which can even now be observed proves that the dust must have been there originally in such quantities that a tellurie origin does not appear at all probable.

I therefore agree with Professor Smith that the dust is of cosmic origin. But a question now arises which Professor Smith has not dwelt on, namely, whether there is any connection between the great eruption in the Straits-Settlements and the arrival of the cosmic dust cloud.

It is hardly likely that the centre of distribution of the after-glow that is of the dust in the air should coincide by chance with the great eruption in space, and the appearance of the dust with the eruption in time. If this coincidence did not occur by chance there are two possible ways of accounting for it: either the eruption was the cause of the appearance of dust or the appearance

of dust was the cause of the eruption. I have given the reasons above why I believe the former not to have been the case, and we must now therefore consider the second alternative.

A dust cloud nearing the earth must necessarily influence the earth by its attraction. The general gravitation will attract the dust cloud to the earth, but also the latter towards the former. When the dust cloud comes near the earth this attraction will be local, near the place where it reaches the outer surface of the atmosphere very much stronger in the moment when it falls than anywhere else, the part of the globe nearest the falling dust cloud will be attracted in a great measure. If the globe were liquid the consequence of this local attraction would be, that on and near the surface from those parts around the place where the dust cloud was descending the mass would tend to flow towards that cloud. The firm crust of the earth cannot of course yield to such a local attraction from without, which can only disturb the equilibrium on the surface ; but the outer liquid coating, the sea, and the inner liquid or semi-liquid mass can obey, and in this case did obey the strain. The sea rose high and swept over the islands, and the liquid mass in the interior of the earth broke forth at a place of little resistance, where the pre-existing volcanoes prove the earth's crust to be weaker than elsewhere in the vicinity of that place, where the cosmic dust cloud struck the atmosphere.

I have ascertained an interesting fact, which goes far to prove the correctness of these statements, and in fact the conclusions drawn therefrom brought me to the explanation which I have presented above.

Tidal waves caused by volcanic eruptions are not rare. They are always caused by a centrifugal shock, and consequently consist of high waves much higher than those caused by the highest tide, which are separated from each other by steep rare valleys. In this case, I had occasion to observe the tidal waves at Lyttleton. Here the irregularity consisted in a *sinking* of the water, which during the whole day never reached even middle water-mark, and was at

times fully six feet lower than spring ebb tide. Of course, if the tidal wave is caused by an attraction from without the neighbouring waters will be drawn from the places around towards the attracting object in this case the falling dust cloud, and this accounts for the great difference between this and other tidal waves, which was also expressed by the extremely long duration of two days in which period the water in Lyttelton was continually below the average height.

I have expressed these views in a similar manner in a paper published in Petermann's Geografische Mittheilungen, where further details are to be found, and to which essay I refer those of my readers who may be interested in the matter.

NOTES AND EXHIBITS.

Mr. Macleay said that by the last mail from San Francisco, he had received from the author, Professor Garman, of the Museum of Comparative Zoology, Cambridge, Mass., a pamphlet, containing a description and illustration of a shark of a very remarkable form. The fish was 5 feet long, with a diameter of less than 4 inches, the head was like that of a snake. the mouth large and terminal, the teeth resembling those of a snake, and it had only one dorsal fin placed opposite the anal. Mr. Garman proposes for this Sea Serpent looking Shark the name of *Chlamydoselachus anguineus*, and thus characterises the Family *Chlamydoselachidæ*. "Body much elongate, increasing in size very little anteriorly. Head depressed. broad. Eyes lateral, without nictitating membrane. Nasal cavity in skull separate from that of mouth. Mouth anterior. Snout broad, projecting very little. Cusps of teeth resembling teeth of serpents. Spiracles small, behind the head. One dorsal, without spine. Caudal without pit at its root. Opercular flap covering first branchial aperture, free across the isthmus. Intestine with spiral valve." The only specimen known, a female, was purchased from Professor H. A. Ward, and is said to have been brought from Japan.